

# **EXHIBIT B-2**

## **MICROELECTRONIC INNOVATIONS L.L.C'S INFRINGEMENT ANALYSIS**

### **U.S. Patent No. 7,177,605 – Qorvo, Inc.**

#### **Claim 1**

Microelectronic Innovations L.L.C. (“MEI”) provides evidence of infringement of claim 1 of U.S. Patent No. 7,177,605 (hereinafter “the ‘605 patent”) by Qorvo, Inc. (“QORVO”). In support thereof, MEI provides the following claim chart.

“Accused Instrumentalities” as used herein refers to at least the Qorvo 85-4200 MHz Wideband Synthesizer/VCO with Integrated 6 GHz RF Mixer including, but not limited to, the exemplary RFFC5072 product and other systems and products having similar claimed circuitry, that Qorvo makes, uses, , imports, offers for sale, and sells to its customers causing them to use the infringing products. The claim chart demonstrates Qorvo’s infringement and provides notice of such infringement, by comparing each element of the asserted claim to corresponding components, aspects, and/or features of the Accused Instrumentalities. The claim chart is not intended to constitute an expert report on infringement. The claim chart includes information provided by way of example, and not by way of limitation.

The analysis set forth below is based only upon information from publicly available resources regarding the Accused Instrumentalities, as Qorvo has not yet provided any non-public information. An analysis of Qorvo’s (or other third parties’) technical documentation and/or software source code may assist in fully identifying all infringing features and functionality. Accordingly, MEI reserves the right to supplement this infringement analysis once such information is made available to MEI. Furthermore, MEI reserves the right to revise this infringement analysis, as appropriate, upon issuance of a court order construing any terms recited in the asserted claims.

MEI provides this evidence of infringement and related analysis without the benefit of claim construction or expert reports or discovery. MEI reserves the right to supplement, amend or otherwise modify this analysis and/or evidence based on any such claim construction or expert reports or discovery.

Unless otherwise noted, MEI contends that Qorvo directly infringes the ‘605 patent in violation of 35 U.S.C. § 271(a) by selling, offering to sell, making, using, and/or importing the Accused Instrumentalities. The following exemplary analysis demonstrates that infringement.

Unless otherwise noted, MEI believes and contends that each element of each claim asserted herein is literally met through Qorvo’s provision of the Accused Instrumentalities. However, to the extent that Qorvo attempts to allege that any asserted claim element is not literally met, MEI believes and contends that such elements are met under the doctrine of equivalents. More specifically, in its investigation and analysis of the Accused Instrumentalities, MEI did not identify any substantial differences between the elements of the patent claims and the corresponding features of the Accused Instrumentalities, as set forth herein. In each instance, the identified feature of the Accused

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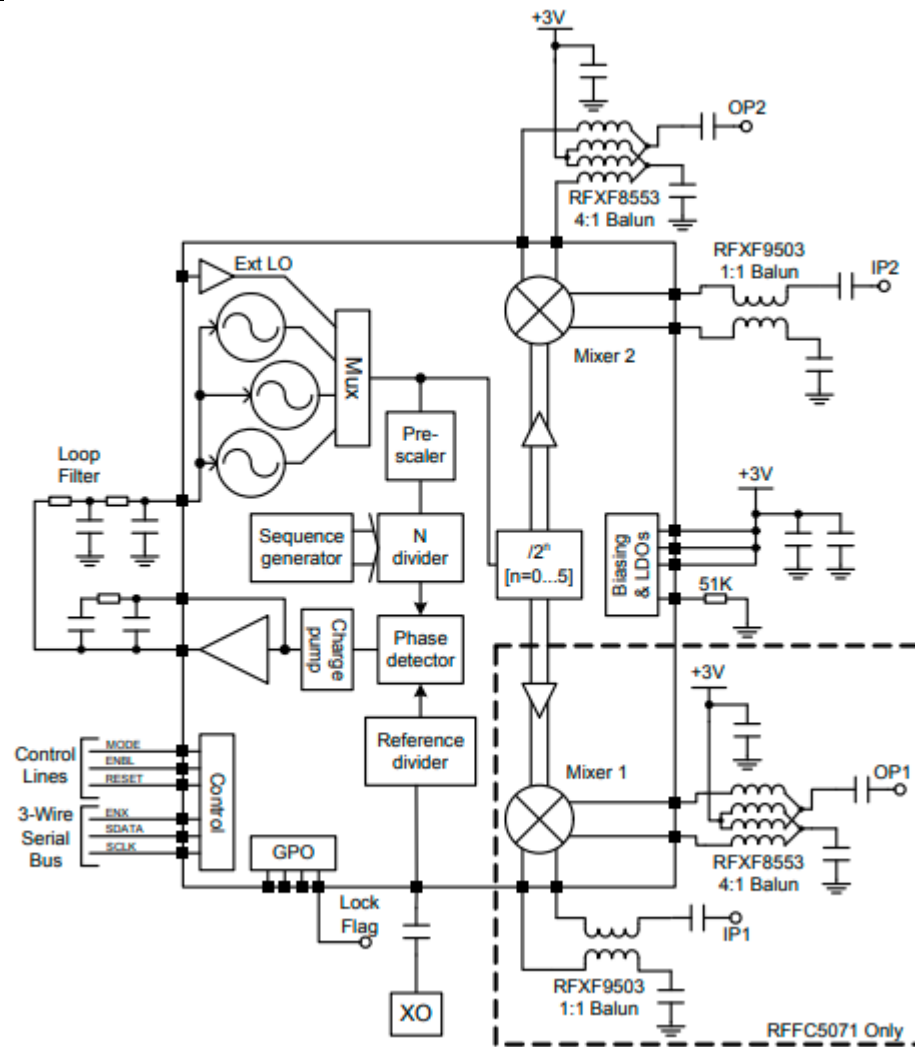
Instrumentalities performs at least substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim element.

To the extent the chart of an asserted claim relies on evidence about certain specifically identified Accused Instrumentalities, MEI asserts that, on information and belief, any similarly functioning instrumentalities also infringes the charted claim. MEI reserves the right to amend this infringement analysis based on other products made, used, sold, imported, or offered for sale by Qorvo. MEI also reserves the right to amend this infringement analysis by citing other claims of the '605 patent, not listed in the claim chart, that are infringed by the Accused Instrumentalities. MEI further reserves the right to amend this infringement analysis by adding, subtracting, or otherwise modifying content in the "Accused Instrumentalities" column of each chart.

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<b>'605 Patent Claim 1</b>	<b>Accused Instrumentalities Including Qorvo RFFC5072 Product</b>
<b>1.pre.</b> A power amplification device comprising:	<p>The Accused Instrumentalities including, but not limited to, the exemplary RFFC5072 product, are 85-4200 MHz Wideband Synthesizer/VCO products with Integrated 6 GHz RF Mixer configured as a power amplification device, <i>see</i> below figures:</p> <p>Details on the Accused Instrumentalities, including the exemplary RFFC5072 product, are available on the Qorvo website, <a href="https://www.qorvo.com/products/p/RFFC5072">https://www.qorvo.com/products/p/RFFC5072</a>, including Integrated Synthesizer/Mixer Register Map Programming Guide <a href="https://www.qorvo.com/products/d/da000753">https://www.qorvo.com/products/d/da000753</a>, including the datasheet for the exemplary RFFC5072 product. <i>See, e.g.,</i> <a href="https://www.qorvo.com/products/d/da000735">https://www.qorvo.com/products/d/da000735</a></p>

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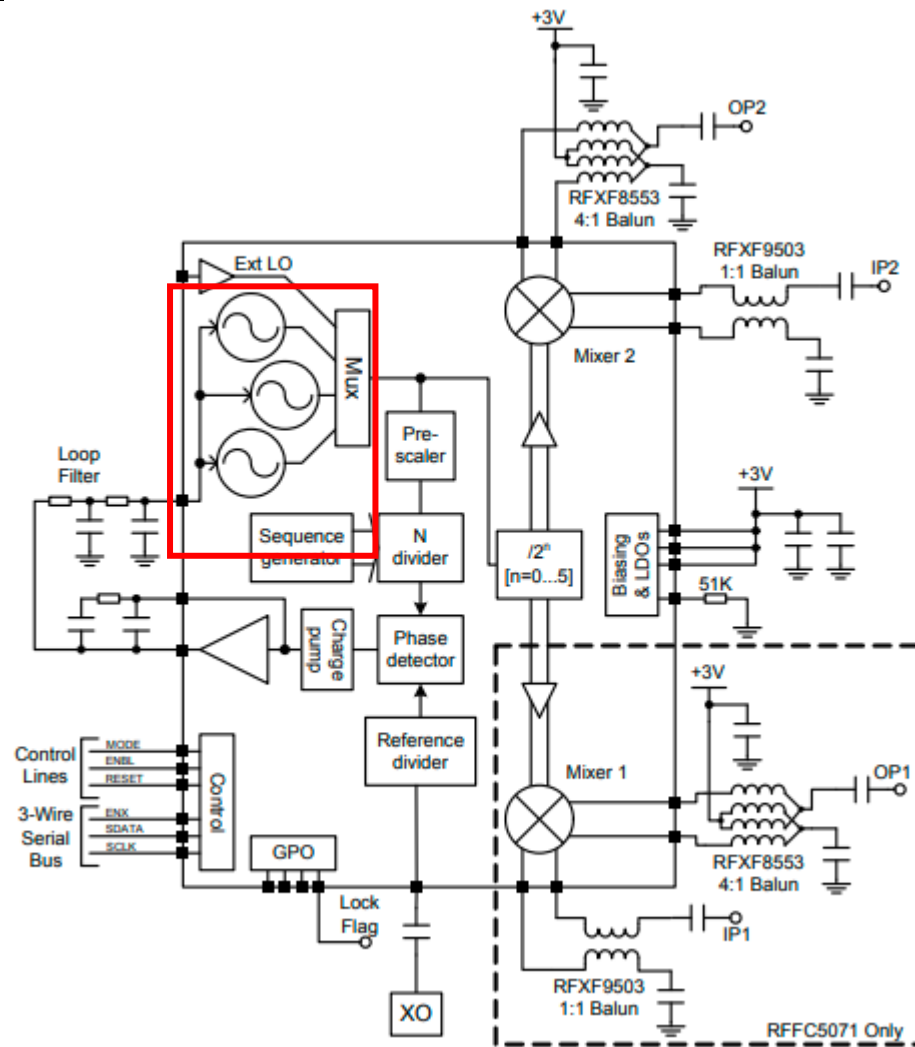


See, <https://www.qorvo.com/products/d/da000735> at 11.

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	<p>The RFFC5071 and RFFC5072 are re-configurable frequency conversion devices with integrated fractional-N phased locked loop (PLL) synthesizer, voltage controlled oscillator (VCO) and either one or two high linearity mixers. The fractional-N synthesizer takes advantage of an advanced sigma-delta modulator that delivers ultra-fine step sizes and low spurious products. The PLL/VCO engine combined with an external loop filter allows the user to generate local oscillator (LO) signals from 85MHz to 4200MHz. The LO signal is buffered and routed to the integrated RF mixers which are used to up/down-convert frequencies ranging from 30MHz to 6000MHz. The mixer bias current is programmable and can be reduced for applications requiring lower power consumption. Both devices can be configured to work</p> <p>See, <a href="https://www.qorvo.com/products/d/da000735">https://www.qorvo.com/products/d/da000735</a> at 1.</p> <p>To the extent any of the above-referenced claim language is construed or applied so that no literal infringement is found, MEI contends that this element is met under the doctrine of equivalents. The above-identified features and instrumentalities perform substantially the same function as the recited claim element, in substantially the same way, to achieve substantially the same result. Any differences are insubstantial.</p> <p>Specifically, the above-identified features perform substantially the same function in the same way as the recited claim element, namely a device having power amplification functionality.</p>
<p><b>1.a.</b> an <b>input</b> for receiving a signal having a desired frequency band; and</p>	<p>The Accused Instrumentalities including, but not limited to, the exemplary RFFC5072 product, include an input for receiving a signal having a desired frequency band. See figures below:</p>

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See, <https://www.qorvo.com/products/d/da000735> at 1.

The VCO core in the RFFC5071 and RFFC5072 consists of three VCOs which, in conjunction with the integrated LO dividers of /2 to /32, cover the LO range of 85MHz to 4200MHz. Each VCO has 128 overlapping bands which are used to achieve low VCO gain and optimal phase noise performance across the whole tuning range. The chip automatically selects the correct VCO (VCO auto-select) and VCO band (VCO coarse tuning) to generate the desired LO frequency based on the values programmed into the PLL1 and PLL2 registers banks.

The VCO auto-select and VCO coarse tuning are triggered every time ENBL is taken high, or if the PLL re-lock self clearing bit is programmed high. Once the correct VCO and band have been selected the PLL will lock onto the correct frequency. During the band selection process, fixed capacitance elements are progressively connected to the VCO resonant circuit until the VCO is oscillating approximately at the correct frequency. The output of this band selection, CT\_CAL, is made available in the read-

See, <https://www.qorvo.com/products/d/da000735> at 5.

The RFFC5071 and RFFC5072 contain a charge pump-based fractional-N phase locked loop (PLL) for controlling the three VCOs. The PLL includes automatic calibration systems to counteract the effects of process and environmental variations, ensuring repeatable loop response and phase noise performance. As well as the VCO auto-select and coarse tuning, there is a loop filter calibration mechanism which can be enabled if required. This operates by adjusting the charge pump current to maintain loop bandwidth. This can be useful for applications where the LO is tuned over a wide frequency range.

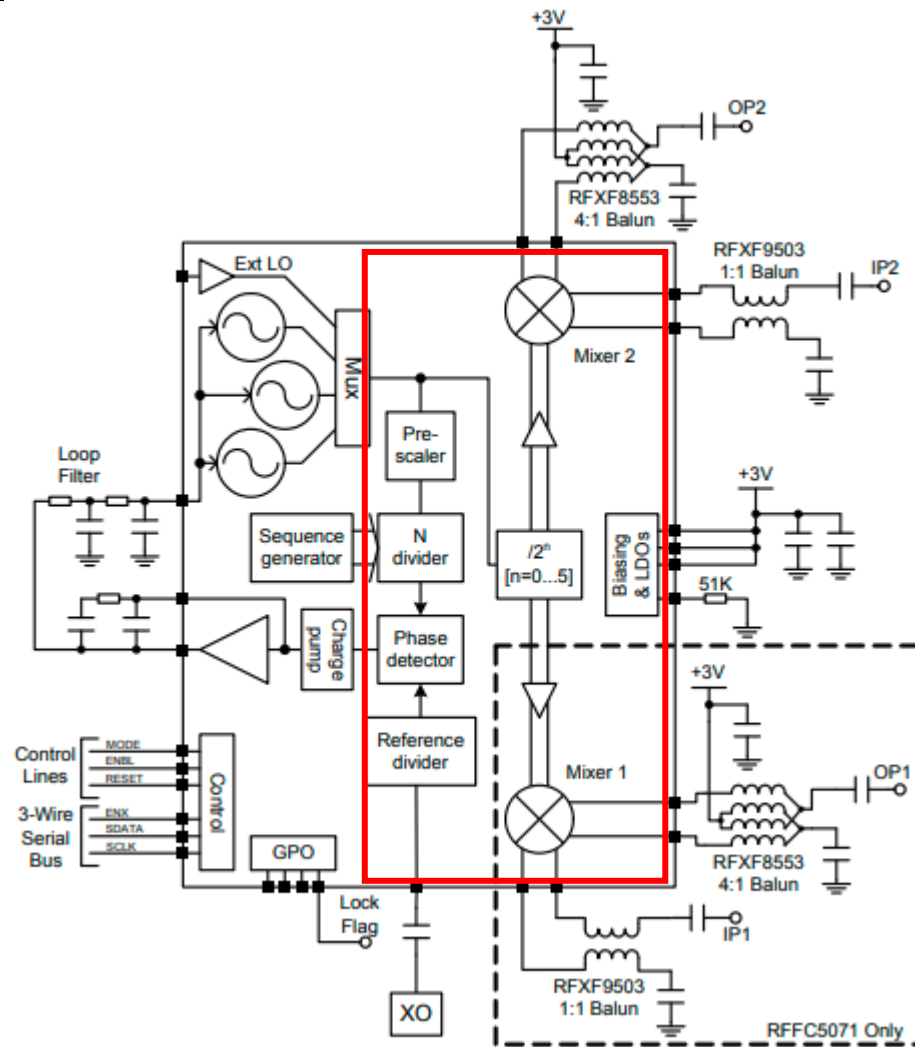
See, <https://www.qorvo.com/products/d/da000735> at 5.

As shown in the figures above, there are VCOs connected with a Phase detector and giving input as feedback to the VCOs through the loop filter, which eliminates the noise. Accordingly, the accused instrumentalities show an input for receiving a desired frequency band signal.

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	<p>To the extent any of the above-referenced claim language is construed or applied so that no literal infringement is found, MEI contends that this element is met under the doctrine of equivalents. The above-identified features and instrumentalities perform substantially the same function as the recited claim element, in substantially the same way, to achieve substantially the same result. Any differences are insubstantial.</p> <p>Specifically, the above-identified features perform substantially the same function in the same way as the recited claim element, namely an input for receiving a signal having a desired frequency band.</p>
<p><b>1.b. power amplification means of the delta-sigma type</b> connected to the input, and having an order greater than or equal to one in the desired frequency band and having an order greater than or equal to one outside the desired frequency band</p>	<p>The Accused Instrumentalities including, but not limited to, the exemplary RFFC5072 product, include power amplification means of the delta-sigma type connected to the input, and having an order greater than or equal to one in the desired frequency band and having an order greater than or equal to one outside the desired frequency band. <i>See</i> the figures below:</p>

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Field Name	Bit Field	Function
fnz	15	If programmed high the modulator to the fractional dividers is disabled. Test mode.
dithr	14	If high then the target frequency (reference of freq_det) is dither by the sigma delta
sdm	13:12	PLL sigma-delta modulator order: 00=first order accumulator, 01=2nd order MASH 1-1, 10=3rd order MASH 1-1-1 and 11=DSM modulator as defined by mode, dith, fm and dmode fields

See, <https://www.qorvo.com/products/d/da000753> at 15.

The VCO core in the RFFC5071 and RFFC5072 consists of three VCOs which, in conjunction with the integrated LO dividers of /2 to /32, cover the LO range of 85MHz to 4200MHz. Each VCO has 128 overlapping bands which are used to achieve low VCO gain and optimal phase noise performance across the whole tuning range. The chip automatically selects the correct VCO (VCO auto-select) and VCO band (VCO coarse tuning) to generate the desired LO frequency based on the values programmed into the PLL1 and PLL2 registers banks.

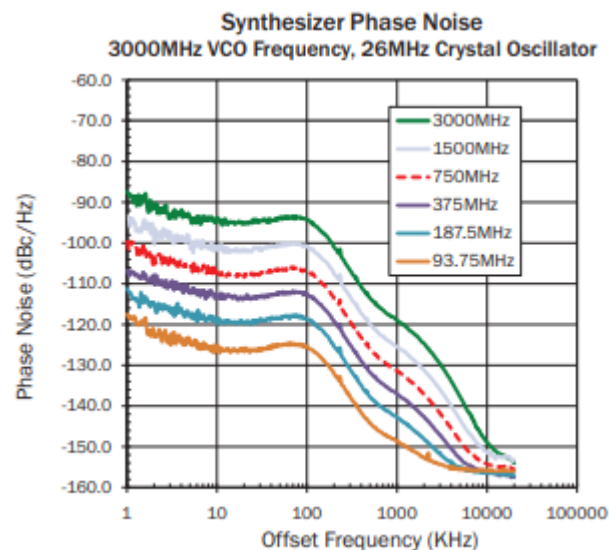
The VCO auto-select and VCO coarse tuning are triggered every time ENBL is taken high, or if the PLL re-lock self clearing bit is programmed high. Once the correct VCO and band have been selected the PLL will lock onto the correct frequency. During the band selection process, fixed capacitance elements are progressively connected to the VCO resonant circuit until the VCO is oscillating approximately at the correct frequency. The output of this band selection, CT\_CAL, is made available in the read-

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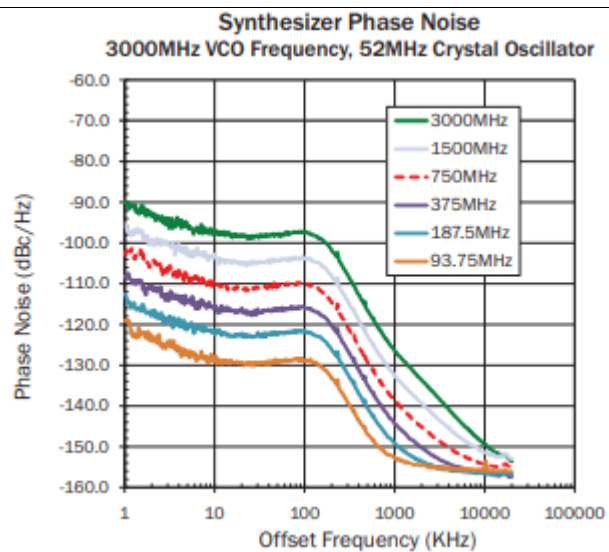
The RFFC5071 and RFFC5072 contain a charge pump-based fractional-N phase locked loop (PLL) for controlling the three VCOs. The PLL includes automatic calibration systems to counteract the effects of process and environmental variations, ensuring repeatable loop response and phase noise performance. As well as the VCO auto-select and coarse tuning, there is a loop filter calibration mechanism which can be enabled if required. This operates by adjusting the charge pump current to maintain loop bandwidth. This can be useful for applications where the LO is tuned over a wide frequency range.

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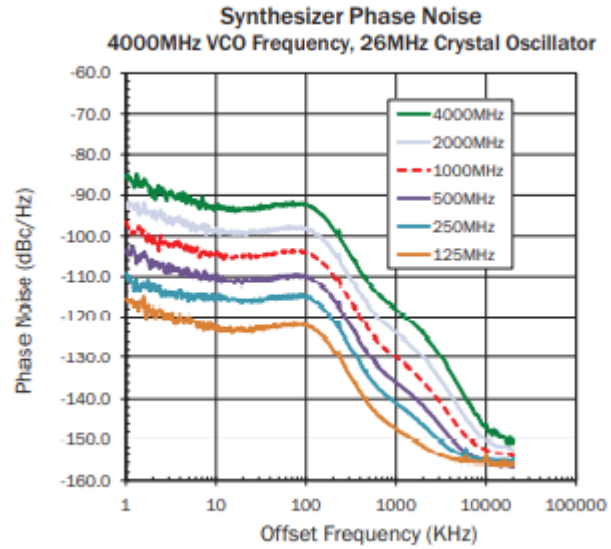
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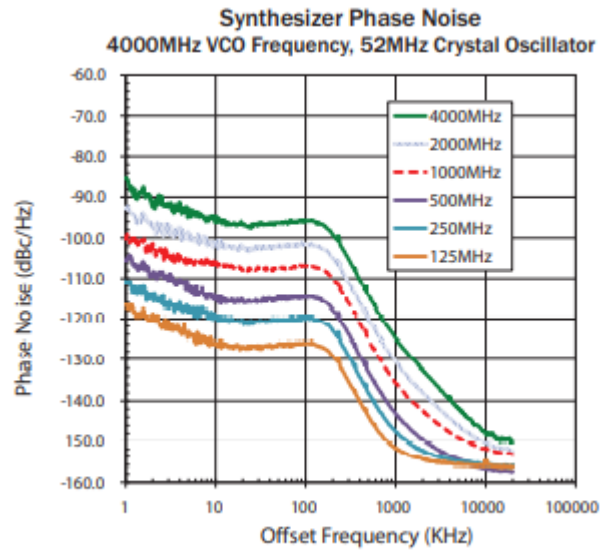
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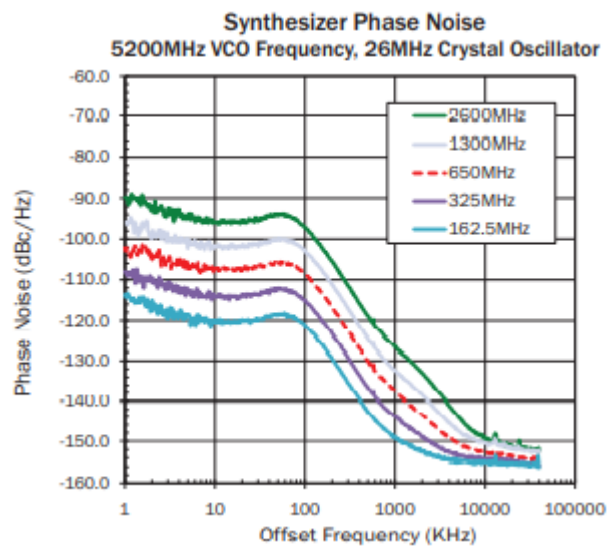
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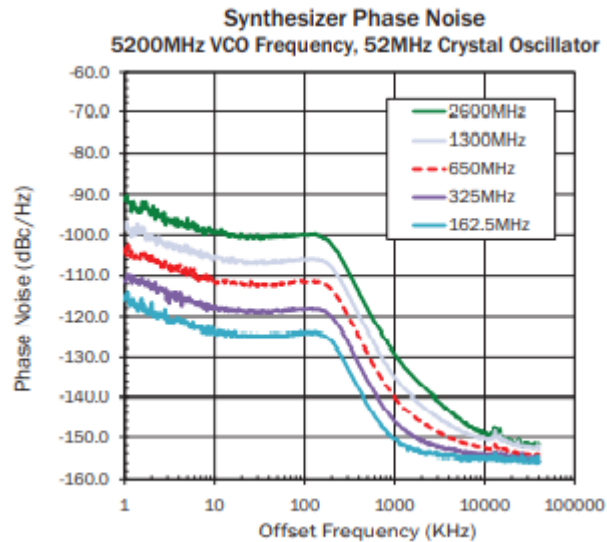
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As shown in the figures above, it is evident that the delta-sigma modulator can have order greater than or equal to one in the desired frequency band (e.g., 3000 MHz) and can also have an order greater than or equal to one outside the desired frequency band (e.g., 5200 MHz).

To the extent any of the above-referenced claim language is construed or applied so that no literal infringement is found, MEI contends that this element is met under the doctrine of equivalents. The above-identified features and instrumentalities perform substantially the same function as the recited claim element, in substantially the same way, to achieve substantially the same result. Any differences are insubstantial.

Specifically, the above-identified features perform substantially the same function in the same way as the recited claim element, namely power amplification means of the delta-sigma type connected to the input and having an order greater than or equal to one in the desired frequency band and having an order greater than or equal to one outside the desired frequency band.

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**Caveat:** The notes and/or cited excerpts utilized herein are set forth for illustrative purposes only and are not meant to be limiting in any manner. For example, the notes and/or cited excerpts, may or may not be supplemented or substituted with different excerpt(s) of the relevant reference(s), as appropriate. Further, to the extent any error(s) and/or omission(s) exist herein, all rights are reserved to correct the same.